



# SEMICONDUCTOR

Equipment and process technology  
for the semiconductor industry

Solar technology

**Semiconductor technology**

Microsystem technology

Medical technology

Circuit board technology



# RENA - MORE THAN AN EQUIPMENT PROVIDER

High throughput, improved process performance and reduced cost-of-ownership - with integrated process and quality control for processing silicon wafers, RENA equipment makes a significant contribution to efficient manufacturing and conditioning of silicon wafers. Decades of experience in the wet chemical treatment of silicon wafers make RENA a popular partner.

HIGH THROUGHPUT

YIELD IMPROVEMENT

TOTAL QUALITY CONTROL

TECHNOLOGY EXPERTISE

RELIABILITY

# THE WET PROCESSING COMPANY

## COMPLETE EQUIPMENT SOLUTIONS FOR WET PROCESSING

SEMICONDUCTOR PRODUCT PLATFORMS
Silicon wafer cleaning, etching and drying equipment
OEM cleaning, etching and drying equipment
Customized wet chemical equipment

## ONE STEP AHEAD OF ITRS DEMANDS

RENA wet process solutions of today meet tomorrow's ITRS (International Technology Roadmap for Semiconductors) demands. Thanks to early development partnerships with our customers we reach market maturity quickly. We work closely with suppliers, universities and international associations.



# SILICON WAFER CLEANING & DRYING

MODULAR EQUIPMENT PLATFORMS  
FOR CLEANING AND DRYING

HIGH THROUGHPUT

CUSTOMER-SPECIFIC SOLUTIONS

VARIABLE INPUT AND OUTPUT

CARRIERLESS HANDLING

## ACD Advanced Clean Dry

Compact three-bath equipment with proven exclusive HF/O<sub>3</sub> technology.

### Properties and benefits

- Integration of several process steps within three baths: SC1, QDR, HF/O<sub>3</sub>
- Excellent particle and metal removal efficiency
- HF/O<sub>3</sub>: metal cleaning, drying and surface conditioning in a single bath
- High uptime

## RCA Clean

State-of-the-art cleaning with pitch compressed processing and high throughput.

### Properties and benefits

- Excellent particle and metal removal efficiency
- Pioneering control and monitoring of media and airflow
- Safe media conditioning
- Short bath changing times
- Low media consumption
- Reduced cost-of-ownership
- Optional integration of various additional processes, e.g. SPM, HF, etc.
- Variety of drying options, e.g. Marangoni®, HF/O<sub>3</sub>
- High uptime

## RENA Wet Clean Equipment

- Modular product families
- Variable input and output: wet input or FOUP (front opening unified pod)
- Integration in fully automatic stocker systems
- Standardized Facility Interfaces: SECS/GEM, XML, etc.
- Cleaning without structural damage
- High throughput due to half pitch processing
- Large international installed base
- Minimum carryover of media due to carrierless handling
- Reduced cost-of-ownership

In addition to standard processes for cleaning silicon wafers, the range of products includes customer-specific adaptable cleaning technologies for all wafer-cleaning steps. The name RENA stands for complete wet process solutions from pre-cleaning to state-of-the-art final cleaning.



## WET CHEMICAL SOLUTIONS MADE BY RENA

“Our mission is to efficiently drive wet chemical production processes forward. We make an important contribution towards innovative semiconductor products and reduced process costs through the use of materials with maximum cleanliness demands, optimised handling and automation technology, as well as improved process control.”

# SILICON WAFER ETCHING

PROCESS EQUIPMENT OF THE LATEST GENERATION - OF OUTSTANDING UNIFORMITY RESULTS

LOW MEDIA CONSUMPTION

IN-SITU PROCESS CONTROL

CARRIERLESS HANDLING

## Etching

Product family with modular and flexible designed equipment for etching silicon wafers.

### Properties and benefits

- Standard etching processes (HF/HNO<sub>3</sub>, KOH, NaOH, H<sub>3</sub>PO<sub>4</sub>, BOE, DHF, SPM, SOM etc.)
- Precise transfer times
- Homogeneous etching over entire 300 mm wafer
- Fully automatic process control
- Defined air flow management
- Carrierless handling
- Minimised carryover of media

RENA

# SILICON WAFER DRYING

DRYING TECHNOLOGIES OF THE LATEST GENERATION FOR HIGH THROUGHPUT

SHORT PROCESS TIMES

PERFORMANCE EXCEEDING ITRS

HIGH THROUGHPUT

STANDARDISED INTERFACES

## Drying

Drying technologies for all silicon wafer cleaning requirements

### Properties and benefits

- Carrierless Transport
- All drying processes from a single source according to equipment design
- Short drying times
- Residue-free drying

### DRYING OPTIONS

- Marangoni® drying
- HF/O<sub>3</sub> drying
- Hot water drying
- Single wafer spin rinse dryer
- Carrier spin rinse dryer



# AUTOMATION SOLUTIONS

ADAPTED HANDLING SYSTEMS  
FOR BEST RESULTS AND MAXIMUM  
PRODUCTIVITY

FULLY OR PARTIALLY AUTOMATED

SHORT CYCLE TIMES

MES INTEGRATION

## Wafer handling and transport

Specially adapted automation and transfer system to ensure safe handling of the silicon wafers.



## Properties and benefits

- Carrierless handling
- Fully or partially automated equipment
- High variability through modular design
- Standard and rapid transfer times < 1 sec
- Customer-specific wafer pitch
- Customer-specific batch sizes
- Easy-maintenance equipment
- Choice of media- and process-specific materials
- Minimum wafer contact
- High throughput due to rapid handling
- Metrology system can be integrated
- Minimised carryover of media





#### **Applications**

- Prime wafer cleaning, etching and drying
- Device wafer cleaning and etching, e.g. silicon nitride stripping
- SOI wafer cleaning, etching and drying
- Reclaim wafer cleaning, etching and drying
- MEMS production
- OEM cleaning and etching equipment
- Customer-specific wet benches and wet chemical equipment

# ANALYTICS & METROLOGY

## ECONOMICAL INTEGRATION OF PROCESS AND QUALITY ASSURANCE

ONLINE/OFFLINE BATH ANALYSIS

ONLINE PROCESS CONTROL

MES INTEGRATION

### Measuring & classification

Bath analysis

Maximum quality standards in all wet process steps are assured through permanent monitoring of process baths.

#### Properties and benefits

- Complete process monitoring
- Process development and production support
- Online/offline bath analysis
- Online/offline titration

### Measurement & characterisation

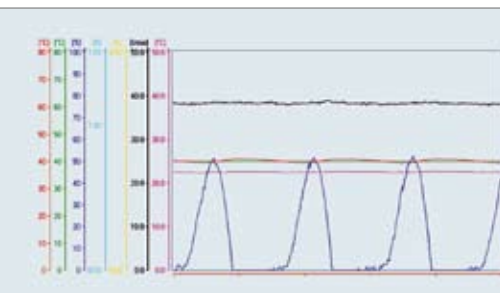
Devices for characterising wafer thickness, etching rates, surface roughness, damage, and other criteria can be integrated in RENA equipment for quality assurance and monitoring of material flow during wet process steps.

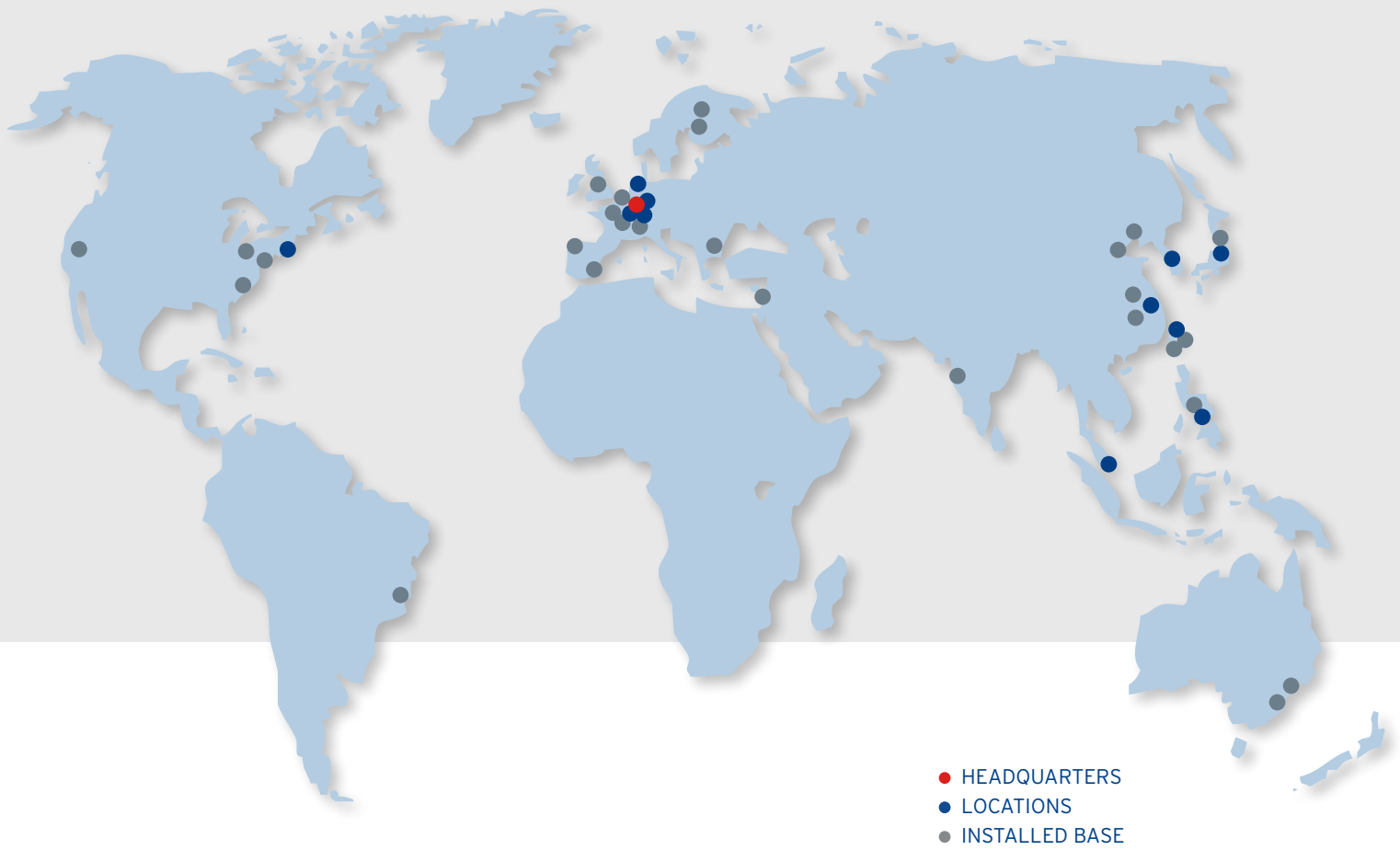
#### Properties and benefits

- In-line metrology
- Surface characterisation, e.g. roughness
- Advanced measurement tools (300 mm)
- Thickness measurement
- Warp and bow detection
- Customised solutions

## CONTINUOUS MONITORING DURING ALL WET PROCESS STEPS

Production processes and quality assurance are further optimised through measurement solutions - to ensure the maximum quality of every wafer.





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